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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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10/698,747

10/31/2003

Kyusik Sin

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03/23/2005

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EXAMINER

NGUYEN, DANG T

ART UNIT

PAPER NUMBER

2824

DATE MAILED: 03/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/698,747

Applicant(s)

SIN ET AL.

Examiner

Dang T. Nguyen

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: Search history.

DETAILED ACTION

1. This action is responsive to the following communications: the Application filed on October 31, 2003.
2. Claims 1 – 27 are pending in this case. Claims 1, 10, and 20 are independent claims.

Claim Objections

3. In claim 4 there is no antecedent basis for the wording, " said read line". There is not reference to "read line" earlier in the claim either in the form of an implied as well as a literal description from which an earlier antecedent reference may be made. The claims fail to particularly point out and distinctly claim the subject matter that the applicant considers to be the invention here. Clarification is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 - 6, 8 - 16, and 18 - 26 are rejected under 35 U.S.C. 102(e) as being anticipated by Ohtani U.S. patent No. 6,717,844 – filed Dec. 31, 2002.

Regarding independent claim 1, Fig. 2 of Ohtani discloses a device comprising:

a spin-dependent tunneling cell [13] including first [18] and second [16] ferromagnetic elements separated by a tunnel barrier layer [17], said first ferromagnetic element [18] having a first magnetic moment (Col. 3 line 38) and said second ferromagnetic element [16] having second magnetic moment (Col. 3 line 36); a first electrically conductive line [DL] that disposed adjacent one of said ferromagnetic elements [16, 18] and provides a magnetic field that changes a direction of said first magnetic moment relative to that of said second magnetic moment (Col. 3 lines 61 - 66); and a second electrically conductive line [PL] that is electrically connected to at least one of said ferromagnetic elements to sense whether electrons can tunnel across said barrier layer, said second electrically conductive line [PL] being connected to a plurality of transistors in parallel (Fig. 1 [9, 7]).

Regarding dependent claim 2, Ohtani discloses wherein said first electrically [DL] connected to least one of said ferromagnetic elements [16].

Regarding dependent claim 3, Ohtani discloses wherein said transistors share source region (Fig. 1 [9, 7]).

Regarding dependent claim 4, Ohtani discloses wherein a read line [PL] includes an uninterrupted electrically conductive path between each of said transistors [11,9] and said one of the ferromagnetic elements [18] to which said read line is connected.

Regarding dependent claim 5, Ohtani discloses wherein said transistors are field effect transistors (Fig. 1 [7, 9]).

Regarding dependent claim 6, Ohtani discloses wherein said transistors are CMOS transistors (Fig. 1 [7, 9]).

Regarding dependent claim 8, Fig. 2 of Ohtani further discloses a pinning structure [15] coupled said second ferromagnetic element to hold said second magnetic moment in a first direction.

Regarding dependent claim 9, Fig. 4 of Ohtani further comprising a plurality of spin-tunneling cells [ML] connected to said first electrically conductive line.

Regarding independent claim 10, Fig. 1 of Ohtani discloses a device comprising:

a plurality of spin-dependent tunneling cells [13, 14] each of which has a state that is one of a plurality of states [read/write]; first and second electrically conductive lines [BL, ZBL, WE, WL, DL] that are disposed adjacent to one of said cells [13, 14] to change said state from a first state to a second state (to read or to write to memory); and third electrically conductive line [PL] that is electrically connected to said one cell to read said states, said third electrically conductive line being connected to a plurality of transistors in parallel [9, 7].

Regarding dependent claim 11, Ohtani discloses wherein said first electrically conductive line [BL, ZBL, WE, WL, DL] is electrically connected to said one cell [13, 14].

Regarding dependent claim 12, Ohtani discloses wherein said transistors [9, 7] share a source region.

Regarding dependent claim 13, Ohtani discloses wherein said read line includes [PL] an uninterrupted electrically conductive path between each of said transistors [11, 9, 7] and said one cell.

Regarding dependent claim 14, Ohtani discloses wherein said transistors are field effect transistors (Fig. 1).

Regarding dependent claim 15, Ohtani discloses wherein said transistors are CMOS transistors (Fig. 1 [2 –7], [3 – 8]).

Regarding dependent claim 16, Ohtani discloses wherein each of said cells includes a ferromagnetic layer (Fig. 2 [16, 18]).

Regarding dependent claim 18, Ohtani discloses wherein said first electrical conductive line [BL] is disposed adjacent to a set [13, 14] of said of said cells.

Regarding dependent claim 19, Ohtani discloses wherein said transistors are each electrical connected ground (Fig. 1 [9 and 10] are electrically connected to ground through transistors 11 and 12).

Regarding independent claim 20, Fig. 3 of Ohtani discloses a device a plurality of spin-dependent tunneling cells [13, 14] that is one a plurality each of which has a states (Col. 3 lines 36 – 38); an electrically conductive bit line [BL] that electrically connected to at least one of said cells; an electrically conductive digit line [DL] that is disposed adjacent to said one cell, such that electrical current flowing simultaneously in said bit line and said digit line changes said state of said one cell from a first state to a second state (Col. 3 lines 61 – 66); and an electrically conductive read line [PL] that is electrically connected to said one cell [13, 14] and connected to a plurality of transistors [7, 9] in parallel, to read said state said one cell when said transistors are all turned on (Col. 4 lines 62 – 64).

Regarding dependent claim 21, Ohtani discloses wherein said transistors are each controlled by a word line [WL].

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Regarding dependent claim 22, Ohtani discloses wherein said transistors share a source region [9, 7].

Regarding dependent claim 23, Ohtani discloses wherein said bit line [BL] extends in a first direction and said digit line [DL] extends in a second direction, said first and second directions being substantially perpendicular to each other (BL perpendicular DL).

Regarding dependent claim 24, Ohtani discloses wherein said transistors are field effect transistors [7, 9].

Regarding dependent claim 25, Ohtani discloses wherein said transistors are CMOS transistors ([2,7] and [3,8]).

Regarding dependent claim 26, Ohtani discloses wherein each of said cells includes ferromagnetic layer (Fig. 2 [16, 18]).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7, 17, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohtani in view of Heide U.S. Patent No. 6,775,183 – filed Oct. 22, 2002.

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Fig.2 [16, 18] of Ohtani as applied to claims 1, 10 and 20 above, disclose ferromagnetic elements, but fails to disclose wherein at least one said ferromagnetic elements includes a half-metallic magnet.

Fig. 4 and 5 of Heide discloses magnetic memory device having ferromagnetic elements includes half-metallic magnet (Col. 11 lines 20 – 23).

Ohtani and Heide are common subject matter of magnetic memory. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporated ferromagnetic taught by Heide into the ferromagnetic of Ohtani, since it metallic magnetic is a well-known material in the art of ferromagnetic and it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In *fr* Leshin, 125 USPQ 416.

Prior art

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Matsutera et al. Pub. No.: US 2005/0002229 A1 Pub. Date: Jan. 6, 2005

Hiner et al. Patent No. US 6,747,301 B1 Date of Patent: Jun. 8, 2004

Contact Information

7. Any inquiry concerning this communication from the examiner should be directed to Dang Nguyen, who can be reached by telephone at (571) 272-1955.

Normal contact times are M-F, 8:00 AM - 4:30 PM.


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Upon an unsuccessful attempt to contact the examiner, the examiner's supervisor, Richard Elms, may be reached at (571) 272-1869.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist, whose telephone number is (703) 305-3900. The faxed phone number for organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the Status of an application may be obtained from the patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or EBC@uspto.gov.

Dang Nguyen 3/14/2005


VAN THUNG NGUYEN
PRIMARY EXAMINER